

Conference Abstract

Harmonising Terminology and Records of Plant Invasion Status Across Federally Managed Countries

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Abstract

Plant invasions are a major threat worldwide, posing significant ecological and economic threats. In federally managed countries—where policy implementation is divided among various jurisdictions under a central federal government—alien plant species pose an even more difficult challenge for management at the national scale due to the fragmented nature of information provided by independent jurisdictions. This has led to inconsistencies in the terminology used to describe species status along the introduction-naturalisation-invasion continuum and disparities in the classification reported by each jurisdiction. Such contrasting information impedes data interoperability at the national level, hampering efficient management and biosecurity actions. This highlights the urgent need for a harmonised framework to ensure data interoperability on biological invasions.

Australia, with its rich endemism and federal structure, provides a robust case to harmonise disparate data sources. We first reviewed the different terminology frameworks proposed for biological invasions (either ecologically- or policy-based,

emphasising, respectively, species' ability to overcome ecological barriers, and impact). We then integrated such frameworks to develop a harmonised framework of invasion terminology for Australia, while also considering the language used by states' Australian herbaria (Martín-Forés et al. 2024).

To do so, we developed an R script to compare existing Australian data sources for vascular plant taxa, including the Australian Plant Census ([APC](#)), state and territory censuses, and the Australian Global Register of Introduced and Invasive Species ([GRIIS](#)). The script consists of a harmonised workflow that identifies mismatches in definitions and records among these sources, enabling us to propose prioritisation procedures to tackle these, and subsequently integrate information into a unified status for each species at the national scale (Martín-Forés et al. 2023b).

The integration of these contrasting data culminated in the creation of a standardised dataset at the Australian national scale, the Alien Flora of Australia (AFA) (Martín-Forés et al. 2023a, Martín-Forés et al. 2023c). The AFA poses a significant advancement in the management of alien flora. The up-to-date information presented in the AFA can aid in early warning of species introduction, facilitate decision-making at various levels, and enhance national biosecurity. The associated script is ready to be implemented into new versions of the AFA with updated releases of any of the data sources, streamlining future efforts to track alien flora across Australia.

The benefits of improving alien species data interoperability are numerous and far-reaching. Ensuring consistency in terminology and classification across jurisdictions is crucial for effective communication and collaboration among stakeholders and across different policy levels. Standardised data allow for more accurate monitoring and reporting of alien species, supporting the development of strategies at different jurisdictional levels for managing alien species, leading therefore to better-informed management decisions. Early detection and rapid response are critical components of effective biosecurity, and the AFA-harmonised dataset enables these actions by providing timely and accurate information at the Australian national scale.

The implementation of the AFA and the associated R script represents a significant step forward in the harmonisation of data sources for detecting biological invasions in Australia. By ensuring consistency in terminology and classification, facilitating early detection and rapid response, and supporting collaborative efforts, harmonised data can enhance the effectiveness of management practices and facilitate conservation initiatives. However, this is just the beginning, as the workflows and script can be modified to suit any other federally managed country, alleviating the complex interplay of biosecurity regulations at different scales and among jurisdictions, enhancing the effectiveness of biosecurity measures. By adopting similar approaches, countries around the world can improve their capacity to manage alien species and protect their unique biodiversity. The model facilitates the sharing of information and best practices among jurisdictions within a given country, and among countries, thus fostering a collaborative approach to biosecurity both at national and international scales.

Harmonising information on biological invasions also has important ecological implications, as alien species can disrupt ecosystems, outcompete native species, and alter habitat structure and function. By improving our ability to monitor and manage alien species, we can help protect biodiversity and maintain ecosystem services. Besides, the economic benefits are also significant, as alien species can cause substantial damage to agriculture, forestry, fisheries, and other sectors, leading to costly control measures and economic losses. By providing a robust framework for data interoperability on biological invasions, we can reduce the economic impact of alien species by enabling synergies among jurisdictions, and therefore more efficient and targeted management efforts.

Thus, harmonisation on biological invasions is crucial for effective biosecurity at the national and international levels. The creation of the AFA demonstrates the benefits of data interoperability, providing a model that can be adapted and implemented in other contexts.

Keywords

alien flora, biological invasions, biosecurity, data interoperability, harmonisation, invasion status, standardised dataset

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Conflicts of interest

The authors have declared that no competing interests exist.

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